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## DOWN BRANCH FIBER FABRIC AND THE FABRICATING METHOD THEREOF

### FIELD OF THE INVENTION

The present invention relates a kind of textile technology for down branch fiber, more particularly the present invention relates to a kind of down branch fiber fabric and its fabricating method.

### BACKGROUND OF THE INVENTION

Feather and down are all good natural heat-retaining materials. Feather has a flat shape with parallel barbs grown on quills in rows. Down has cloud shape and can be grouped by down-feather and semi-plume, where down feather is fluffy structure and with little or no shaft, semi-plume does not have well developed barbicels, which make it soft and fluffy structure, but semi-plume has well formed shaft. For these characters, feather and down don't belong to fiber. With common technology, we can strip off barb-fiber of the feather or down-branch-fiber of the down or semi-plume from their quill or shaft to get separated barb-fiber and down-branch-fiber. Furthermore, the barb-fiber has same structure with but is coarser than the down-branch-fiber. **We call the barb-fiber and down-branch-fiber both as down branch fiber thereafter.** Since down branch fiber has very tiny barbules and hooks distributing equally along fiber, the down branch fiber is considered as a kind of hetero-fiber with unique nature and many merits, for example, soft, light, heat retaining, etc. However, using common textile technologies such as combing, twisting, draughting, it is hard to process down branch fibers since the natured hetero-fibers are non-crimp, fluffy, and very short, most of them are around 15mm to 25mm. This is why people use feather, barb-branch-fiber and down branch fiber as stuffing materials for making down garment, quilts, ticks and other bedding only.

Patent Publication Number CN1222591A titled "Down Branch Fiber Fabric and Its Fabricating Method" and Patent Publication Number CN1293270A titled "Down Shell

Fabric” described a kind of fabricating method for down and down-branch-fiber fabric with textile fibers.

According to the common knowledge in the down products industry, down is not only depicted as small, soft, fluffy which is found under the contour feathers of waterfowls such as geese, ducks and the like, but also depicted as a mixture of down, feather, barb-fiber, down branch fiber and other impurity, where the ration of down must be over the lowest standard stipulated. The down described in the above-mentioned two patent publications is not a kind of material having same structure, it can’t be considered as fiber too. Where, the concept of fiber is for the kind of natural or synthetic thin filiform of textile material only. Downs can’t be used as textile materials for fabrication directly. If inweave downs with other textile materials, it is impossible to get a smooth and uniform yarns since down is fluffy and mixed with other impurity, such as feather and barb-fibers. During processing downs are blown away since they can’t be mixed with other textile fibers as a uniform combination.

## SUMMARY OF THE INVENTION

The purpose of the present invention is to provide a fabricating method for down branch fiber and its products, i.e. down branch fiber fabrics with strong tensile strength.

The above-mentioned objects are achieved by:

Down branch fiber fabrics are made by mixing down branch fibers with textile fibers, having a blend ration by weight of down branch fiber 10-100%, textile fiber 0-90%.

The down branch fiber is gotten from handling downs and feathers, which are gathered from waterfowls such as geese, ducks and the like. Cut quills and shafts off from downs, semi-plumes and feathers, then get down branch fiber.

Textile fibers are selected at least one from nature fibers including cotton, wool, ramie fiber or synthetic fibers including terylene, acrylic, nylon, polyvinyl chloride, spandex, vinylon or chemical viscose fibers.

The method for producing down branch fiber having following processes: screening raw materials, sliver feeding, twisting, winding packages, heat setting and weaving. The temperature for heating setting is from 80° to 120° C, heating time is from 5 to 20 minutes.

The sliver feeding device comprises raw material tank, feeding conveyer belt, adjustable even roller, brambly catching roller, first subsiding room, even roller, brambly dividing roller, second subsiding room. All these sub-devices are through connected. Discharging port having bar shape is connected with dust cages coincidentally.

The present invention possesses many advantages compare with common technologies in this field:

A. The sliver feeding device has the brambly catching roller and the brambly dividing roller to comb down branch fibers twice; has the adjustable even roller and the even roller to control quota of down branch fibers well-distributed around the process; has first and second subsiding rooms to subside the raw materials twice in smooth and equal quantity to ensure that the down branch fibers can pass through the discharging port uniformly. With above-mentioned devices, the present invention solves the difficulty for processing down branch fibers, i.e. non-crimp, fluffy and can't hold together. Therefore, the difficulty for producing down branch fibers as yarns with current processing (combing, twisting, and drafting) is overcome. The present invention finds a way to use down branch fibers to produce yarns directly without a crimp treatment or a denaturation treatment. Thus, the new devices avoid breaking or damaging down branch fibers during process. Therefore, textile products made by down branch fibers are a reality.

B. Since the present invention adapts reel heat Setting, the shortcomings of down-branch fibers, such as non-crimp, restoring original shape, anti-twisting, low tensile strength, etc. is overcome.

C. Down branch fiber is a kind of nature hetero-fiber. It is light, heating-retaining. The fabrics made by this kind of nature hetero-fiber also keep these merits.

D. The present invention provides bright future to use down branch fibers to fabricate different types of pretty and decent products.

## DETAILED DESCRIPTION OF THE DRAWINGS

Figure 1 is a sketch figure showing the structure of the sliver feeding devise.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In Figure 1, a preferred embodiment of the present invention is constructed of a sliver feeding devise, it has a raw material tank 1, a brambly catching roller 4, a brambly dividing roller 7; a feeding conveyer belt 12 is in the bottom of the raw material tank 1; a inclined feeding conveyer belt 2 with fan shape tooth 10 is located at the end of the feeding conveyer belt 12; a adjustable ever roller 3 is located above the middle of the inclined feeding conveyer belt 2; the brambly catching roller 4 is located at the top of the inclined feeding conveyer belt 2; a first subsiding room 5 is located under the brambly catching roller 4; an even roller 6 with the brambly dividing roller 7 are located the end of the first subsiding room 5, rollers 6 and 7 have opposite turning directions; a second subsiding room 8 is located under the brambly dividing roller 7, its discharging port appears bar shape; the discharging port is connected with two dust cages 9 coincidentally; the two dust cages 9 have inhaling chambers, that make the two dust cages 9 in negative pressure, the two dust cages 9 have same turning directions; the fist and second subsiding rooms 5 and 8, the brambly catching roller 4 and brambly dividing roller 7, the chamber 11 for the feeding conveyer belt 12, they are through connected by the case 13.

## EMBODIMENT 1

A kind of down branch fiber fabric has a blend ration by weight of 70% down branch fiber and 30% textile fiber.

Process:

Raw material screening → sliver feeding → twisting → winding packages → heat setting → weaving → end product storing

Procedure demonstration:

A. Raw material screening:

Get down branch fibers by cutting their quills and shafts off from feathers and downs, where the feathers and downs are gathered from waterfowls such as geese, ducks and the like. Textile fibers are adopted from at least one of textile yarn or long silk yarn, which are made from nature fibers including cotton, wool, ramie fiber, or synthetic fibers including terylene, nylon, acrylic, polyvinyl chloride, polypropylene, spandex, vinylon, or chemical viscose fibers.

B. Sliver feeding equipment:

This equipment is solely accommodated for down branch fiber's nature characteristics, such as non-crimp, fluffy, non-hold, etc. The down branch fibers or its mixtures are sent out from the raw material tank by the feeding conveyer belt, controlled by the adjustable even roller continuously, even and in quantity, then fed to brambly catching roller, then combed twice by the brambly catching roller and brambly dividing roller, then evened again by the even roller, then subsided twice by the first and second subsiding rooms; and then fed out through the discharging port finally. A continuous, even strip in certain quantity falls down into a wedge groove consisted by the two dust cages with negative pressure. Finally, even thin strips are produced.

#### C. Twisting:

Before twisting, according to different raw materials, yarns or long silk yarns as heart yarns are led into the thin strips of down branch fiber, and then according to friction spinning technology by means of the two dust cages with negative pressure and same turning direction twists them together to form down branch fiber yarns, as a result down branch fibers wrap up with heart yarns.

#### D. Winding packages:

Use current technology to wind the down branch fiber mixture yarns on cones.

#### E. Heat setting

Put down branch fiber yarn on cones into a calorstat-room to heat up, during the heat setting period, heating temperature is generally from 80° to 120°C, and total spending time is from 5 to 20 minutes.

#### F. Weaving

Through knitting or weaving, make many kinds of fabrics with heat-retaining feature from down branch fiber yards.

#### G. Put qualified products in storehouses

Inspect products and put qualified products in storehouses

### EMBODIMENT 2

A kind of down branch fiber fabric has a blend ration by weigh of 100% down branch fiber and 0% textile fiber.

Process:

Raw material screening → sliver feeding → twisting → winding packages → heat setting  
→ self-twist spinning → weaving → end product storing

Procedure demonstration:

A. Twisting:

Use the two dust cages with negative pressure and same turning direction to twist the thin strips of down branch fibers to form down branch fiber yarns in line with modern friction spinning technology.

B. Self-twist spinning

In line with the current textile technology spin the down branch fiber yarns into strands.

C. Weaving

Through knitting or weaving, make strands as different kinds of fabrics with heat-retaining feature.

D. Other working procedures are the same as the embodiment 1.

Embodiment 3

A kind of down branch fiber fabric has a blend ration by weight of 90% down branch fiber and 10% textile fiber.

Process:

Raw material screening → sliver feeding → twisting → winding packages → heat setting  
→ wrapping → weaving → end product storing

Procedure demonstration:

A. Raw material screening:

Textile fibers are adopted from nature fibers or synthetic fibers or long silk yarns.

**B. Wrapping:**

Use down branch fiber yard as heart yarn, where wrap the heart yarn by nature fibers or synthetic fibers or long silk yarns to form a wrapping heart yarn.

C. Other working procedures are the same as the embodiment 1.

**EMBODIMENT 4**

A kind of down branch fiber fabric has a blend ration by weight of 50% down branch fiber and 50% textile fiber by weight.

**Process:**

Raw material screening → mixing → sliver feeding → twisting → winding packages → heat setting → weaving → end product storing

**Procedure demonstration:**

**A. Raw material screening:**

Textile fibers are adopted from nature fibers or synthetic fibers.

**B. Mixing:**

Mix down branch fibers with nature and/or synthetic fibers.

**C. Twisting:**

Use two dust cages with negative pressure and same turning direction to twist the thin strip of the mixture of down branch fibers nature and/or synthetic fibers to become a strip or a roving in correspondence with the turning rate of the dust cages. Then use rotor spinning and self-actor mules to spin them to become fine counts.



D. Other working procedures are the same as the embodiment 1.

## EMBODIMENT 5

A kind of down branch fiber fabric has a blend ration by weigh of 10% down branch fiber and 90% textile fiber.

Process is the same as the embodiment 4.

Procedure demonstration:

### A. Weaving

Using down branch fiber yarn or down branch fiber mixture yarn as woof, other yarns as warp to weave.

B. Other working procedures are the same as the embodiment 4.

## EMBODIMENT 6

A kind of down branch fiber fabric has a blend ration by weigh of 20% down branch fiber and 80% textile fiber by weight.

Process:

Raw material screening → mixing → sliver feeding → twisting → winding packages → heat setting → self-twist spinning → weaving → end product storing

Procedure demonstration:

### A. Self-twist spinning

Self-twist spin the down branch fiber yarn or down branch fiber mixture yarn with other fiber yarns to become strand yarn.

B. Other working procedures are the same as the embodiment 4.